

Claims

I claim:

1. For use with a trim press having a die build up plate that is mounted to a first platen, a striker plate that is mounted to a second platen, and wherein the trim press moves one of the first or second platens such that the trim press travels between a load position in which the cutting edge is spaced from the striker plate and a cutting position in which the cutting edge confronts the striker plate, a die for cutting a thermoformed plastic article from a sheet of thermoformable plastic comprising:

a knife element connected to the die build up plate that includes a cutting edge for severing the thermoformable plastic sheet when the knife element confronts the striker plate; and

a heater in thermal communication with the knife element for heating the knife element.

2. The die of claim 1 wherein the heater is a band heater that is adhered to the knife element about a substantial portion of its perimeter.

3. The die of claim 1 further comprising a thermocouple for measuring a temperature of the knife element and a temperature control module for controlling the heater based on the measured temperature to maintain the knife element temperature within a range of desired temperatures.

4. The die of claim 1 further comprising a die travel stop mounted to the die build up plate that limits travel of the trim press by engaging a feature on the striker plate when the trim press moves beyond the cutting position.

5. The die of claim 4 wherein the die travel stop comprises a post element that is mounted on the die build up plate that limits travel of the trim press to no further than a position at which the cutting edge first contacts the striker plate.

6. The die of claim 1 further comprising:

a die board moveably mounted to the die build up plate that is moveable within a range of positions on a plane defined by the die build up plate and wherein the knife element is fixed to the die board; and

a die location pilot connected to the die board that engages a registration feature associated with the plastic article such that when the trim press is in the cutting position the registration feature co-acts with the location pilot to move the die board relative to the die build up plate such that the knife element is placed in a predetermined cutting alignment with respect to the plastic article.

7. The die of claim 6 wherein the die location pilot is a post element that includes a generally conical recess that engages a protrusion on the plastic sheet to guide the knife element into the predetermined cutting position.

8. The die of claim 6 wherein the die board includes a plurality of mounting holes that are oversized with respect to mounting posts on the die build up plate such that when the die board is mounted to the die build up plate the die board can slide on the die build up plate within the range defined by the oversized holes.

9. For use with a trim press having a die build up plate that is mounted to a first platen, a striker plate that is mounted to a second platen, and wherein the trim press moves one of the first or second platens such that the trim press travels between a load position in which the cutting edge is spaced from the striker plate and a cutting position

in which the cutting edge confronts the striker plate, a die for cutting a thermoformed plastic article from a sheet of thermoformable plastic comprising:

a knife element connected to the die build up plate and wherein the knife element includes a cutting edge for severing the thermoformable plastic sheet when the one of the first or second platens is in the cutting position; and

a die travel stop connected to the die build up plate that engages a surface on the striker plate to limit travel of the trim press when it travels to the cutting position.

10. The die of claim 9 wherein the die travel stop and the knife element are fixed to a die board that is mounted to the die build up plate and wherein the die travel stop is a post that protrudes from the die board a distance that is less than or equal to a distance the knife element protrudes from the die board.

11. The die of claim 9 comprising a knife heater in thermal communication with the knife element.

12. The die of claim 11 wherein the heater is a band heater that is adhered to the knife element about a substantial portion of its perimeter.

13. The die of claim 11 further comprising a thermocouple for measuring a temperature of the knife element and a temperature control module for controlling the heater based on the measured temperature to maintain the knife element temperature within a range of desired temperatures.

14. The die of claim 10 wherein the die board includes a plurality of mounting holes that are oversized with respect to mounting posts on the die build up plate such that when the die board is mounted to the die build up plate the die board can slide on the die build up plate within the range defined by the oversized holes.

15. The die of claim 14 wherein the post element includes a generally conical recess that engages a protrusion on the plastic sheet to guide the knife element into a predetermined cutting alignment with respect to the outer periphery of the plastic article.

16. For use with a trim press having a die build up plate that is mounted to a first platen, a striker plate that is mounted to a second platen, and wherein the trim press moves one of the first or second platens such that the trim press travels between a load position in which the cutting edge is spaced from the striker plate and a cutting position in which the cutting edge confronts the striker plate, a die for cutting a thermoformed plastic article from a sheet of thermoformable plastic comprising:

a die board moveably mounted to the die build up plate that is moveable within a range of positions on a plane defined by the die build up plate;

a knife element fixed to the die board and wherein the knife element includes a cutting edge for severing the thermoformable plastic sheet when the trim press is in the cutting position; and

a die location pilot connected to the die board that engages a registration feature associated with the plastic article such that when the trim press is in the cutting position, the registration feature co-acts with the die location pilot to move the die board relative to the die build up plate such that the knife element is placed in a predetermined cutting alignment with respect to the plastic article.

17. The die of claim 16 wherein the die board includes a plurality of mounting holes that are oversized with respect to mounting posts on the die build up plate such that when the die board is mounted to the die build up plate the die board can slide on the die build up plate within the range defined by the oversized holes.

18. The die of claim 16 wherein the die location pilot is a post element that includes a generally conical recess that engages a protrusion on the plastic sheet to guide the knife element into a predetermined cutting alignment with respect to the outer periphery of the plastic article.

19. The die of claim 16 comprising a knife heater in thermal communication with the knife element.

20. The die of claim 19 wherein the heater is a band heater that is adhered to the knife element about a substantial portion of its perimeter.

21. The die of claim 19 further comprising a thermocouple for measuring a temperature of the knife element and a temperature control module for controlling the heater based on the measured temperature to maintain the knife element temperature within a range of desired temperatures.

22. The die of claim 16 further comprising a die travel stop mounted to the die build up plate that limits travel of the trim press by engaging a feature on the striker plate when the trim press travels to the cutting position.

23. The die of claim 22 wherein the die travel stop comprises a post element that is mounted on the die board in proximity to the knife element that limits travel of the trim press to no further than a position at which the cutting edge first contacts the striker plate.

24. For use with a trim press having a die build up plate that is mounted to a first platen, a striker plate that is mounted to a second platen, and wherein the trim press moves one of the first or second platens such that the trim press travels between a load position in which the cutting edge is spaced from the striker plate and a cutting position

in which the cutting edge confronts the striker plate, a die for cutting a thermoformed plastic article from a sheet of thermoformable plastic comprising:

a knife element connected to the die platen that defines an outer periphery of the thermoformed plastic article and includes a cutting edge for severing the thermoformed plastic when the die platen confronts the striker platen; and

a conductive material sensing probe disposed on the die platen in proximity to the knife element that contacts thermoformable plastic when the die platen confronts the striker platen and wherein in the absence of thermoformable plastic the material sensing probe contacts an electrically conductive portion of the striker platen to activate an electrical circuit that provides an indication of the absence of thermoformable plastic.

25. For use with a trim press having a die build up plate that is mounted to a first platen, a striker plate that is mounted to a second platen, and wherein the trim press moves one of the first or second platens such that the trim press travels between a load position in which the cutting edge is spaced from the striker plate and a cutting position in which the cutting edge confronts the striker plate, a die for cutting a thermoformed plastic article from a sheet of thermoformable plastic comprising:

a die board moveably mounted to the die build up plate wherein the die board includes a plurality of mounting holes that are oversized with respect to mounting posts on the die build up plate such that when the die board is mounted to the die build up plate the die board can slide on the die build up plate within the range defined by the oversized holes;

a knife element affixed to the die board, said knife element defining an outer periphery of the thermoformed plastic article and including a cutting edge for severing the thermoformable plastic sheet when the knife element confronts the striker plate;

a heater element in thermal communication with the knife element for heating the knife element; and

a die travel stop mounted to the die board that limits travel of the trim press by engaging a feature on the striker plate when the trim press travels to the cutting position,

wherein the die travel stop is a post element, said die travel stop further functioning as a die location pilot that includes a generally conical recess that engages a protrusion on the plastic sheet to guide the knife element into a predetermined cutting alignment with respect to the outer periphery of the plastic article.

26. The die of claim 1 further comprising:

a die board mounted to the die build up plate and wherein the knife element is fixed to the die board; and

a die location pilot connected to the die board that engages a registration feature associated with the plastic article such that when the trim press is in the cutting position the registration feature co-acts with the location pilot to move the plastic article relative to the die build up plate such that the knife element is placed in a predetermined cutting alignment with respect to the plastic article.